

INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(SUPPLEMENTAL SHEET)

International application No.  
PCT/EP2004/013651

AP3 Rec'd PCT/PTO 09 JUN 2005

**Re Point I**

**Basis of the opinion**

The amendments introduced by letter dated 08-04-2005 introduce facts which, contrary to PCT Article 34(2)(b), go beyond the content of disclosure of the international application as originally filed. These relate to claims 1 and 29.

In these claims, a thermal barrier coating is used in a steam turbine having an inner housing and an outer housing to adapt different thermal expansion properties of these two housings.

However, this use of a thermal barrier coating is not disclosed in the application as originally filed (in particular description p. 14, lines 7-14 and lines 29-34).

Therefore, the present opinion has been based on the independent claims 1 and 29 as originally filed. Therefore, the dependent claims have also been interpreted as being dependent on claims 1 and 29 as originally filed (or newly filed independent claim 2).

**Re Point V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

1. Reference is made to the following documents:

- D1: DE 195 35 227 A (ASEA BROWN BOVERI) 27 March 1997
- D2: DE 723 476 C (BBC BROWN BOVERI & CIE) 5 August 1942
- D3: US 6 336 789 B1 (HUSTER HOSEF *ET AL*) 8 January 2002
- D4: EP 0 374 603 A (G&H MONTAGE; DAIMLER BENZ AG) 27 June 1990
- D5: US 4 405 284 A (ALBRECHT GUENTER *ET AL*) 20 September 1983
- D6: US 5 350 599 A (RIGNEY DAVID V *ET AL*) 27 September 1994
- D7: US 6 345 953 B1 (GOBRECHT EDWIN *ET AL*) 12 February 2002

2. The present application does not meet the requirements of PCT Article 33(1), because the subject matter of claims 1 and 29 is not novel within the meaning of PCT Article 33(2).

2.1 Document D1 discloses (the references in parentheses relate to said document):

the use of a thermal barrier coating (3) for a steam turbine (column 1, line 8), which comprises a plurality of housings (1, 4), for adapting different thermal deformation properties (column 3, lines 40-42) of the housing (1), wherein,

the housing (1) is exposed to a temperature difference, caused by a higher temperature on one side of the housing and a low temperature on the other side of the housing (column 1, lines 17-20), the thermal barrier coating (3) being applied to the side of the housing (1) which is at the higher temperature (cf. figure).

2.2 The subject matter of claim 1 is not therefore novel.

2.3 Document D2 discloses (the references in parentheses relate to said document):

a steam turbine (page 1, line 1) which has two housing (1, 2), the housings (1, 2) having a thermal barrier coating (3, 4), the thermal barrier coating being present in at least two housings (1, 2), and a different thermal barrier action of the thermal barrier coating being present in the housings (1, 2) (page 2, lines 11-34).

2.4 The subject matter of claim 29 is not therefore novel.

3. The present application does not meet the requirements of PCT Article 33(1), because the subject matter of claim 2 does not involve an inventive step within the meaning of Article 33(3).

3.1 Document D2 discloses (the references in parentheses relate to said document):

the use of a thermal barrier coating for a steam turbine (page 1, lines 1-2), in order to avoid distortion of the housings (page 1, lines 34-39) and therefore in order to avoid an inadmissible reduction in radial clearances (page 1, lines 28-33), wherein the steam turbine has a plurality of housings (1, 2) of a blading region and the thermal barrier coating is present on the housing of the blading region (Figure).

3.2 The subject matter of claim 1 therefore differs from the known use of a thermal barrier coating by virtue of the fact that the thermal barrier coating is used to reduce radial clearances.

3.3 However, it is generally known to a person skilled in the art that thermal barrier coatings can be used not only to avoid distortion but also at the same time to reduce radial clearances, cf. for example D3 (abstract), D4 (column 2, lines 4-13) and D5 (column 1, lines 35-45).

3.4 A person skilled in the art would also use the thermal barrier coating which is known from D2 to reduce radial clearances according to circumstances without thereby being inventive.

3.5 Therefore, the subject matter of claim 2 does not involve an inventive step.

4. Moreover, it is noted that independent claims 1, 2 and 29 do not meet the PCT requirements for novelty and inventive step with regard to documents D4-D6 either.

4.1 The subject matter of claims 1 and 2 differs from the use of a thermal barrier coating which is known from D4 only by virtue of the use in a steam turbine rather than in a turbocharger or another turbomachine. A person skilled in the art would also use the thermal barrier coating known from D4 in steam turbines according to circumstances, since he is aware that the same technical problems are encountered in steam turbines as in other turbomachines. The same reasoning likewise applies to D5.

4.2 D6 discloses all the features of claim 29.

5. Dependent claims 3-28 and 30 do not contain any features which, in combination with the features of any claim to which they refer back, meet the PCT requirements for inventive step, since the additional features are already known from the prior art or are of the kind that a person skilled in the art routinely makes on the basis of familiar considerations; cf. for example:

- for claim 3: D2
- for claim 4: D4, figures
- for claims 6, 7, 9, 12 and 13: D5, column 2, line 49 - column 3, line 26
- for claims 14-16: D7, column 4, line 27 - column 5, line 39
- for claims 19 and 20: D2
- for claims 21 and 22: D1, figures

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- for claims 23 and 24: D3
- for claim 28: D6, column 2, line 43 - column 3, line 40
- for claim 30: D4, Figure 1

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5.1 Moreover, it is also noted that the functional details in claim 10 ("the higher ... is"), 27 ("without ... being increased") and 30 ("the thermal barrier coating ... is exposed") do not enable a person skilled in the art to determine what technical features are required in order to carry out the abovementioned functions. However, the claims, as far as it is possible to discern, do not appear to meet the PCT requirements for inventive step.

6. The invention is industrially applicable in the field of steam turbines (PCT Article 33(4)).